What is claimed is:

1. A self-compensating hydrostatic bearing, comprising:

a bearing rail;

a bearing carriage constructed and arranged to be mounted for hydrostatically supported movement on said bearing rail, said bearing carriage including

a plurality of self-compensating bearing pads provided on surfaces that oppose said bearing rail, said plurality of self-compensating bearing pads being constructed and arranged to be in fluid communication with one another and with a pressurized fluid source;

end sealing structures provided on end portions of said bearing carriage, at least one edge of said end sealing structure engaging said bearing rail to prevent hydrostatic fluid from leaking from between said bearing carriage and said bearing rail;

side sealing structures provided on side portions of said bearing carriage and extending at least a portion of a length of said bearing carriage, at least one edge of said side sealing structure engaging said bearing rail to prevent hydrostatic fluid from leaking from between said bearing carriage and said bearing rail; and

a fluid return system provided within portions of said bearing carriage that are sealed by said end and side sealing structures, said fluid return system being constructed and arranged to route fluid towards said pressurized fluid source.

2. The hydrostatic bearing of claim 1, wherein said bearing rail includes at least one substantially contiguous support surface constructed and adapted to support said hydrostatic bearing.

3. The hydrostatic bearing of claim 2, wherein said end sealing structures each include a double-lipped seal.

4. The hydrostatic bearing of claim 3, wherein said side sealing structures are contiguous with said end sealing structures.

5. The hydrostatic bearing of claim 4, wherein said bearing carriage comprises a central portion and removably mounted keeper portions.

6. The hydrostatic bearing of claim 5, wherein said side sealing structures are provided on said keeper portions.

7. The hydrostatic bearing of claim 6, wherein said fluid return system comprises one or more drain grooves in communication with said bearing pads.

8. The hydrostatic bearing of claim 7, wherein said drain grooves are positioned between said bearing pads and said side sealing structures so as to receive fluid directed from the bearing pads towards said side sealing structures.

9. The hydrostatic bearing of claim 7, wherein said fluid return system further comprises at least one reservoir in communication with said one or more drain grooves, said at least one reservoir being constructed and arranged to hold fluid being routed back towards the pressurized fluid source.

10. The hydrostatic bearing of claim 9, wherein said bearing includes one end sealing structure and one reservoir on each end of said bearing carriage.

11. The hydrostatic bearing of claim 10, wherein said reservoirs are defined by a portion of a portion of the ends of said bearing carriage and are sealed by the double-lipped seal of said end sealing structure.

12. The hydrostatic bearing of claim 11, wherein said end sealing structures include fluid inlet ports constructed and arranged to receive hydraulic fluid hoses, said fluid input ports being in fluid communication with said bearing pads.

13. The hydrostatic bearing of claim 12, wherein said end sealing structures include fluid outlet ports constructed and arranged to receive hydraulic fluid hoses, said fluid outlet ports being in fluid communication with said reservoirs.

14. The hydrostatic bearing of claim 13, wherein said rail and said bearing carriage have rectilinear shapes.

15. The hydrostatic bearing of claim 14, wherein said drain grooves are provided at corners of said bearing carriage.

16. The hydrostatic bearing of claim 1, wherein said bearing rail has a T-shaped cross-sectional area.

17. The hydrostatic bearing of claim 1, further comprising one or more fastening holes provided on upper surfaces of said bearing carriage, said fastening holes being constructed and arranged to allow a machine component to be removably mounted on said bearing carriage.

18. A machine tool mounted on one or more hydrostatic bearings according to claim 1.

19. A self-compensating hydrostatic bearing, comprising:

a bearing rail including at least one substantially contiguous support surface constructed and arranged to support said hydrostatic bearing;

a bearing carriage constructed and arranged to be mounted for hydrostatically supported movement on said bearing rail, said bearing carriage including

a plurality of self-compensating bearing pads provided on surfaces that oppose said bearing rail, said plurality of self-compensating bearing pads being constructed and arranged to be in fluid communication with one another and with a pressurized fluid source;

sealing structure provided on portions of said bearing carriage, at least one edge of said sealing structure engaging said bearing rail to prevent hydrostatic fluid from leaking from between said bearing carriage and said bearing rail; and

a fluid return system provided within portions of said bearing carriage that are sealed by said sealing structure, said fluid return system being constructed and arranged to route fluid towards said pressurized fluid source.

20. The hydrostatic bearing of claim 19, wherein said sealing structure comprises contiguous side and end sealing portions.

21. The hydrostatic bearing of claim 20, wherein said end sealing portion comprises a double-lipped seal.

22. The hydrostatic bearing of claim 21, wherein said bearing carriage comprises a central portion and removably mounted keeper portions.

23. The hydrostatic bearing of claim 22, wherein said side sealing portions are provided on said keeper portions.

24. The hydrostatic bearing of claim 23, wherein said fluid return system comprises one or more drain grooves in communication with said bearing pads.

25. The hydrostatic bearing of claim 24, wherein said drain grooves are positioned between said bearing pads and said side sealing structures so as to receive fluid directed from the bearing pads towards said side sealing structures.

26. The hydrostatic bearing of claim 25, wherein said fluid return system further comprises at least one reservoir in communication with said one or more drain grooves, said at least one reservoir being constructed and arranged to hold fluid being routed back towards the pressurized fluid source.

27. The hydrostatic bearing of claim 26, wherein one end sealing portion and one reservoir are provided on each end of said bearing carriage.

28. The hydrostatic bearing of claim 27, wherein said reservoirs are defined by a portion of the ends of said bearing carriage and are sealed by the double-lipped seal of said end sealing portion.

29. The hydrostatic bearing of claim 28, wherein said end sealing portions include fluid inlet ports constructed and arranged to receive hydraulic fluid hoses, said fluid input ports being in fluid communication with said bearing pads.

30. The hydrostatic bearing of claim 29, wherein said end sealing portions include fluid outlet ports constructed and arranged to receive hydraulic fluid hoses, said fluid outlet ports being in fluid communication with said reservoirs.

31. The hydrostatic bearing of claim 30, wherein said rail and said bearing carriage have rectilinear shapes.

32. The hydrostatic bearing of claim 31, wherein said drain grooves are provided at corners of said bearing carriage.

33. The hydrostatic bearing of claim 19, further comprising one or more fastening holes provided on upper surfaces of said bearing carriage, said fastening holes being constructed and arranged to allow a machine component to be removably mounted on said bearing carriage.

34. The hydrostatic bearing of claim 19, wherein said bearing rail has a T-shaped cross-sectional area.

35. A machine tool mounted on one or more hydrostatic bearings according to claim 19.

36. A bearing carriage, comprising:

one or more bearing pads constructed and arranged to receive fluid from a pressurized fluid source and to cause that fluid to flow selectively over a collection of bearing grooves and resistive lands so as to create a supporting fluid layer between said bearing carriage and a structure on which said bearing carriage is mounted for movement; and

a fluid recovery system constructed and arranged to prevent fluid from flowing out of the space between said bearing carriage and the structure on which said bearing carriage is mounted for movement and to route the fluid back towards the pressurized fluid source, said fluid recovery system comprising:

a sealing structure having contiguous end and side portions, said end portions being constructed and arranged to seal ends of said bearing carriage and said side portions being constructed and arranged to extend along at least a portion of sides of said bearing carriage to seal said sides, said end portions including a double-lipped seal, a first lip of the double-lipped seal engaging the structure on which said bearing carriage is mounted for movement and a second lip of said double-lipped seal preventing debris from entering said bearing carriage;

reservoir structures defined by portions of said bearing carriage and sealed by said sealing structure; and

drain grooves constructed and arranged to conduct pressurized fluid from said bearing pads to said reservoir structures.

37. The bearing carriage of claim 36 wherein said drain grooves are between said bearing pads and the side portions of said sealing structure.

38. The bearing carriage of claim 37, wherein the structure on which said bearing carriage is mounted for movement is a bearing rail having a shape complimentary to that of the bearing carriage.

39. The bearing carriage of claim 38, wherein the bearing rail has a T-shaped cross-sectional area.

40. The bearing carriage of claim 39, wherein said bearing carriage is comprised of a central portion and removably mounted keeper portions.

41. The bearing carriage of claim 40, wherein the side portions of said sealing structure are received in grooves provided in said keeper portions.

42. The bearing carriage of claim 41, wherein the side portions of said sealing structure have a substantially upwardly-facing u-shaped cross-section.

43. The bearing carriage of claim 36, wherein the end portions of said sealing structure include fluid inlet and outlet ports, said fluid inlet ports being in fluid communication with said bearing pads and said fluid outlet ports being in communication with said reservoir structures.

44. A hydrostatic bearing comprising:

a bearing rail; and

a bearing carriage constructed and arranged to be mounted for hydrostatically supported movement on said bearing rail, said bearing carriage including

one or more bearing pads provided on surfaces that oppose said bearing rail, said one or more bearing pads being constructed and arranged to be in fluid communication with a pressurized fluid source;

seal receiving grooves;

a sealing structure having contiguous side and end portions, at least a portion of said sealing structure being adapted to be received in the seal receiving grooves of said bearing carriage, end portions of said sealing structure including double-lipped seals;

a fluid return system including a plurality of drain grooves in fluid communication with said one or more bearing pads, at least some of said plurality of drain grooves being positioned between the bearing pads and the side portions of said sealing structure.

45. The hydrostatic bearing of claim 45, wherein said bearing carriage further comprises one or more reservoirs in fluid communication with said plurality of drain grooves.

46. The hydrostatic bearing of claim 45, wherein said reservoirs are provided in end portions of said bearing carriage.

47. The hydrostatic bearing of claim 44, wherein said bearing rail has a rectilinear shape.

48. The hydrostatic bearing of claim 47, wherein said bearing rail has a T-shaped cross-sectional area.

49. The hydrostatic bearing of claim 44, wherein said one or more bearing pads are self-compensating bearing pads.

50. A method of sealing a hydrostatic bearing carriage, comprising:

causing or allowing hydrostatic fluid to flow from hydrostatic bearing pads provided in the bearing carriage into drain grooves provided along the sides of the bearing carriage;

preventing leakage from the drain grooves by positioning sealing structures along the sides of the bearing carriage so as to capture hydrostatic fluid flowing out from the drain grooves;

collecting the hydrostatic fluid in a reservoir provided as a portion the hydrostatic bearing carriage;

preventing the hydrostatic fluid from leaving the reservoir except through designated outlets using a first portion of an end sealing structure; and

preventing debris from entering the bearing carriage using a second portion of the end sealing structure.

51. A hydrostatic bearing pad, comprising:

a compensating groove;

an adjacent pocket groove enclosing therein a first planar area constructed and arranged to resist a flow of pressurized fluid when said hydrostatic bearing pad is in a load supporting position relative to another surface; and

a second planar area interposed between said compensating groove and said pocket groove, said planar area being constructed and arranged to resist the flow of the pressurized fluid from said compensating groove to said adjacent pocket groove when said bearing pad is in the load supporting position relative to the other surface;

wherein said bearing pad does not include grooves between the compensating groove and the pocket groove.

52. The hydrostatic bearing pad of claim 51, further comprising a supply groove proximate to said compensating groove, said supply groove and said compensating groove being separated by a third planar area that is constructed and arranged to resist the flow of pressurized fluid from said supply groove to said compensating groove.

53. A self-compensating hydrostatic bearing, comprising:

a bearing rail;

a bearing carriage constructed and arranged to be mounted for hydrostatically supported movement on said bearing rail, said bearing carriage including a plurality of bearing pads, ones of said plurality of bearing pads including

a compensating groove;

an adjacent pocket groove enclosing therein a first planar area constructed and arranged to resist a flow of pressurized fluid when said bearing pad is in a load supporting position relative to said bearing rail; and

a second planar area interposed between said compensating groove and said pocket groove, said planar area being constructed and arranged to resist the flow of the pressurized fluid from said compensating groove to said adjacent pocket groove when said bearing pad is in the load supporting position relative to the other surface;

wherein the ones of said plurality of bearing pads do not include grooves between the compensating groove and the pocket groove;

drain grooves extending along the length of said bearing carriage, said drain grooves being constructed and arranged to receive fluid flowing from said plurality of bearing pads; and

sealing structure having side and end portions, the side portions of said sealing structure being constructed and arranged to sealingly engage said bearing rail to prevent fluid in said drain grooves from flowing out of said drain grooves.

54. The hydrostatic bearing of claim 53, wherein the drain grooves are in fluid communication with reservoirs provided in end portions of said bearing carriage, said reservoirs including fluid inlet and outlet ports in communication with a hydraulic power unit.

55. The hydrostatic bearing of claim 54, wherein the reservoirs are sealed by the end portions of said sealing structure.

56. The hydrostatic bearing of claim 53, wherein the end portions of said sealing structures include double-lipped seals.

57. A hydrostatic bearing, comprising:

a bearing rail having a substantially T-shaped cross-sectional area;

a bearing carriage constructed and arranged to engage said bearing rail, said bearing carriage having one or more bearing pads, each of said one or more bearing pads including

a first groove;

an adjacent pocket groove enclosing therein a first planar area constructed and arranged to resist a flow of pressurized fluid when said bearing carriage is in a load supporting position relative to said bearing rail; and

a second planar area interposed between said first groove and said pocket groove, said planar area being constructed and arranged to resist the flow of the pressurized fluid from said first groove to said adjacent pocket groove when said bearing pad is in the load supporting position relative to the other surface;

said bearing carriage further comprising drain grooves constructed and arranged to receive fluid from said one or more bearing pads and direct the fluid towards a fluid return;

wherein said one or more bearing pads do not include drain grooves between said first groove and said adjacent pocket groove.

58. The hydrostatic bearing of claim 57, wherein the hydrostatic bearing is self-compensating.

59. The hydrostatic bearing of claim 57, wherein said bearing carriage further comprises separable keeper portions that engage portions of said bearing rail.

60. The hydrostatic bearing of claim 59, wherein said keeper portions include sealing structures mounted within seal grooves.

61. The hydrostatic bearing of claim 60, wherein said drain grooves are provided in said keeper portions; and

wherein the drain grooves in said keeper portions are arranged so as to be between said bearing pads and said sealing structures.